REMARKS

Claim rejections 35 USC §101 and §112

Claim 9 has been cancelled

Claim rejections -- 35 USC §102

Claims 1-8 are rejected under §102 over Hess ('995 or '084). The applicant respectfully traverses the rejection.

Hess (US 3,943,084 -- 1976 and US 4,015,995 – 1977) describes a delayed mineral acid catalyst formulation for an 80:20 furfuryl alcohol prepolymer: furfuryl alcohol monomer to be used in a process of stabilizing an oil well.

In the first instance, Hess discloses the use of an "acid-releasing compound" consisting of a base reacted with an acid. The catalyst he uses is a reacted product made from two chemical, not the acid component itself. While one of the acids listed to make this "acid-releasing compound" is maleic anhydride, the reference does not teach or suggest the use of maleic anhydride alone as a catalyst.

Furthermore, the claims in the current application contain the features of water as a solvent, and the use of specifically recited stabilizing compounds that are not disclosed in Hess.

Double patenting

The claims of the present application are provisionally rejected under obviousness-type double patenting over 10/398,123. The applicant respectfully traverses.

For the purposes of discussion, it may be helpful to refer to the two applications in question by the catch-phrase used by the assignee for the two inventions in question. The invention in US 10/398,123 is called "Black", in reference to the extremely dark color of the wood products impregnated according to this method. The current invention, on the other hand, is referred to as "Brown I", for its lighter color.

"Black" is a formulation that uses maleic and other organic anhydrides dissolved in neat furfuryl alcohol as catalysts. The furfuryl alcohol and the catalyst are the only ingredients of the solution. This furfuryl alcohol-anhydride solution impregnated into wood is completely converted to polymer therein, producing a highly-loaded material with a dark color (hence the name "black").

The keys to this invention are that the catalyst system is soluble in the furfuryl alcohol without any solubility enhancers required, and the furfuryl alcohol and catalyst enters the wood uniformly. Previous art catalyst systems remained near the wood surface, leaving the furfuryl alcohol deeper in the wood uncatalyzed. They also needed to be dissolved in a solvent before they could be mixed with the furfuryl alcohol. The presence of solvent and the different adsorption properties of furfuryl alcohol and catalyst produced a non-uniform product with polymerized furfuryl alcohol on the exterior and free furfuryl alcohol in the center. The "black" invention makes a product that is uniformly polymerized throughout the cross section, with no free furfuryl alcohol inside the wood.

"Black" produces wood highly-loaded with polymer. That is desirable for some purposes, but the extreme darkness, hardness, weight and high cost are not useful for many products. Instead, more lightly-loaded wood was desired. Being able to have low loading and control it was the objective. The current application concerns a method whereby the furfuryl alcohol monomer-catalyst solution is diluted in water, thereby achieving those different physical properties. .

"Brown" formulation of the current invention use the same catalysts as "black" because these catalysts are the best for the purpose. However, it not possible to simply mix the "black" solution with water and obtain a useful solution for modifying wood. The first problem is that catalyzed furfuryl alcohol does not mix well with water. Instead, it remains separated.

Solubilizers and certain sequences of mixing are needed to make them mix. Once mixed, they tend to react in the solution and form polymer there. So a second problem to overcome was to make a solution with useful working life. The keys to the waterborne "brown" invention are method of mixing and the use of solubilizers and stabilizers. These are not needed nor contemplated in the "Black" invention, and are respectfully believed neither suggested by, nor obvious in light of "Black".